



STATEMENT OF BASIS
SPACE LAUNCH COMPLEX 11
SOLID WASTE MANAGEMENT UNIT NO. 36
45TH SPACE WING
CAPE CANAVERAL AIR FORCE STATION
BREVARD COUNTY, FLORIDA



PURPOSE OF STATEMENT OF BASIS

This Statement of Basis (SB) has been developed in order to inform the public and give the public an opportunity to comment on a proposed remedy to clean up contamination at the Space Launch Complex (SLC-11). A 45th Space Wing (45th SW) installation restoration partnering (IRP) team consisting of United States Air Force (USAF), United States Environmental Protection Agency (USEPA), the State of Florida Department of Environmental Protection (FDEP), the U. S. Army Corps of Engineers, and various environmental consultants have determined that the proposed remedy is cost effective and protective of human health and the environment. However, prior to implementation of the proposed remedy, the 45th SW IRP team would like to

Brief Site Description

SLC-11 is located on Heavy Launch Road, between SLC-12 and SLC-36. The facility was constructed in 1957 to support the USAF Atlas Missile program. Currently, several SLC-11 facilities are used to support SLC-36 operations.

give an opportunity for the public to comment on the proposed remedy. At any time during the public comment period, the public may comment as described in the "How Do You Participate" section of the SB. Upon closure of the public comment period, the 45th SW IRP team will

evaluate all comments and issues raised in the comments and determine if there is a need to modify the proposed remedy prior to implementation.

WHY IS CLEANUP NEEDED?

The results of the Resource Conservation and Recovery Act (RCRA) Facility

Investigation (RFI) indicated that several volatile organic compounds (VOCs) are present in the groundwater at levels that could be potentially harmful to human health.

Additionally, a metal and a polychlorinated biphenyl (PCB) in the soil (listed in Table 1) are present at levels that could be potentially harmful to a hypothetical future resident.

HOW DO YOU PARTICIPATE?

The 45th SW IRP team solicits public review and comment on this SB prior to implementation of the proposed remedy as a final remedy. The final remedy for SLC-11 will eventually be incorporated into the Hazardous and Solid Waste Amendments

The Clean-up Remedy

The proposed clean-up remedy for SLC-11 includes (but is not limited to) the following components:

- Natural attenuation of groundwater to remove contaminants through natural processes, primarily biodegradation.
- Implementation of land use controls designed to prevent exposure to site contaminants. These include:
 - Prohibition of residential development.
 - Periodic monitoring of groundwater to document water quality and contaminant levels.
 - Posting warning signs on-site.

A complete list of land use controls and other protective measures are found in the SLC-11 Land Use Control Implementation Plan (LUCIP).

(HWSA) Permit for Cape Canaveral Air Force Station (CCAFS).

The public comment period for this SB and the proposed remedy will begin on the date that a notice of the SB's availability is published in a major local newspaper of general circulation. The public comment period will end 45 days thereafter. If requested during the comment period, the 45th SW IRP team will hold a public meeting to respond to any oral comments or questions regarding the proposed remedy. To request a hearing or provide comments, contact the following person in writing within the 45-day comment period:

Mr. Jorge Caspary
FDEP-Bureau of Waste Cleanup
2600 Blair Stone Road, MS-4535
Tallahassee, FL 32399-2400
E-mail: Jorge.Caspary@dep.state.fl.us
Telephone: (850) 921-9986

The HSWA Permit, the SB, and the associated Administrative Record, including the RFI Report, will be available to the public for viewing and copying at:

Environmental Management, CEV/ESC
Facility 1638, Samuel Phillips Parkway
Cape Canaveral Air Force Station, FL
For public access call (321) 853-0965

This information can also be found on-line at
http://www.mission-support.org/45SW_IRP_EA

The HSWA Permit, the SB, and SLC-11 Report summaries will be available for viewing and copying at:

Central Brevard Library
308 Forrest Avenue
Cocoa, FL, 32922

To request further information, you may contact one of the following people:

Ms. Teresa Green
Environmental Restoration Element Chief
45 CES/CEVR
1224 Jupiter Street
Patrick Air Force Base, FL 32925-3343
E-mail: teresa.green@patrick.af.mil
Telephone: (321) 853-0965

Mr. Jorge Caspary
See previous contact information

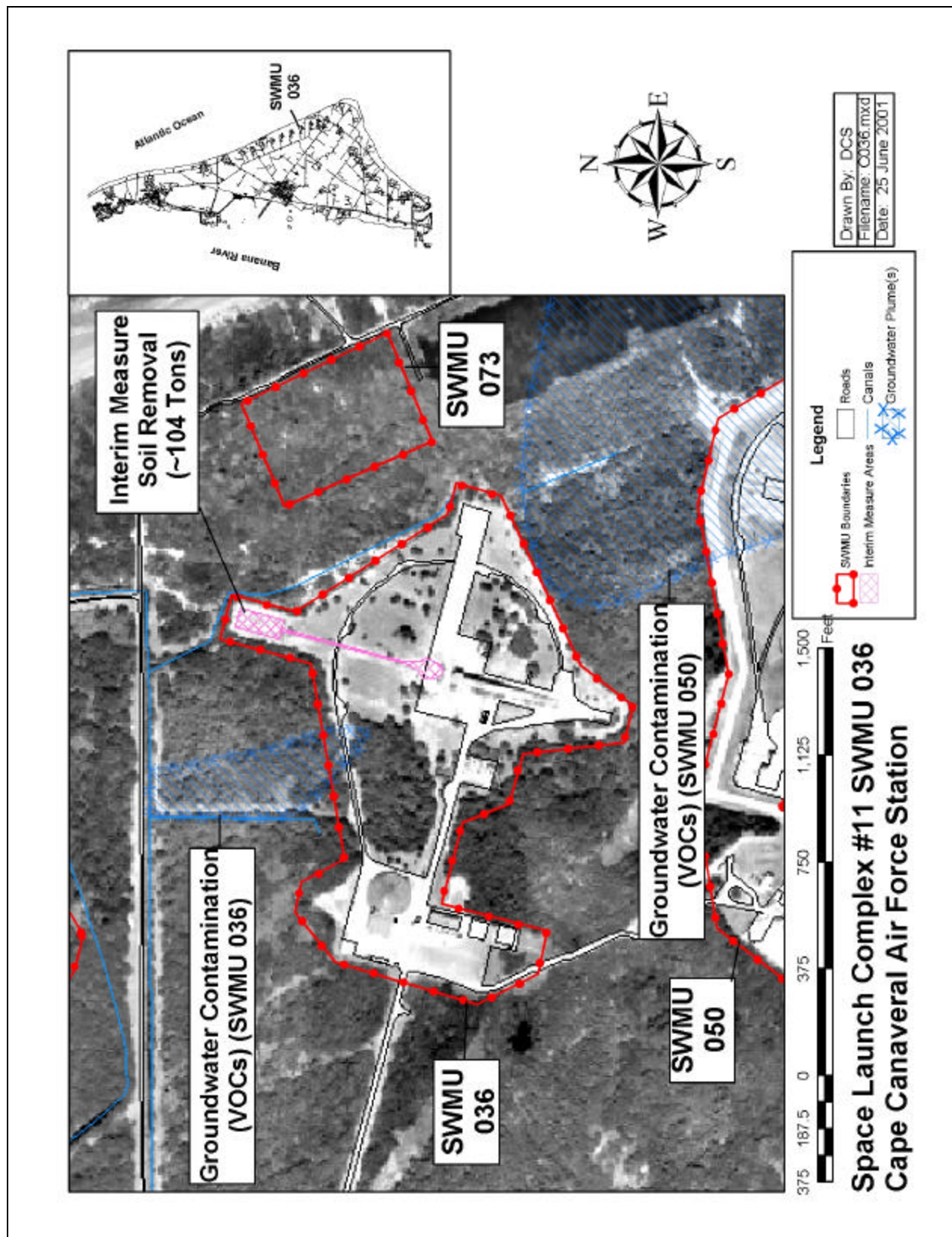
Mr. Timothy R. Woolheater, P. E.
EPA Federal Facilities Branch
Waste Management Division
Sam Nunn Atlanta Federal Center
61 Forsyth Street
Atlanta, GA 30303-8960
E-mail: woolheater.tim@epamail.epa.gov
Telephone: (404) 562-8510

FACILITY DESCRIPTION

USAF established the 45th SW as the primary organization for the Department of Defense aerospace force programs. Historically, the National Aeronautics and Space Administration (NASA) also performed space launch related operations on the 45th SW property. These operations have involved the use of toxic and hazardous materials. Under RCRA and the HSWA Permit (CCAFS Permit No. FL2800016121) issued by the USEPA, the 45th SW was required to perform an investigation to determine the nature and extent of contamination from Solid Waste Management Unit (SWMU) No. 36, Space Launch Complex 11.

SITE DESCRIPTION AND HISTORY

SLC-11 was built in 1957 to support the USAF Atlas missile program. Vehicle assembly check-out and launching activities occurred at the site between 1957 and 1966. The site also served as a training ground (1960-1963) for NATO troops in the deployment of the Atlas as an Intercontinental Ballistic Missile. Regular painting and maintenance operations also occurred at the site. SLC-11 was deactivated in 1966 and salvaged in 1967. Most of the



In accordance with RCRA Section 7004(b), this Statement of Basis summarizes the proposed remedy for CCAFS SLC-11. For detailed information, consult the SLC-11 RFI Report which is available for review at the 45th SW Environmental Management Office (See "How Do You Participate") or on-line at http://www.mission-support.org/45SW_IRP_EA.

complex is now abandoned, except for launch support and ready buildings which actively support Space Launch Complex 36 activities.

The Atlas Missiles utilized liquid propellants including RP-1 and liquid oxygen. Solvents were used to flush rocket engine components. These and other hazardous materials were stored and used at various locations around SLC-11. During launch operations, thousands of gallons of water per minute were used to suppress vibrations and for cooling purposes. These “deluge” waters were collected in a concrete flumeway and basin before being released to the environment.

It is suspected that the launch stand and other site support structures were painted with coatings that contained PCBs. It is believed that the PCBs helped the paint withstand the extreme temperatures generated at launch time. Discharge of contaminated deluge waters and dispersion of the paint chips that resulted from sandblasting operations are considered the primary causes of site contamination.

The USAF conducted the following investigations:

- 1993: A Preliminary Assessment including records search, site reconnaissance, and interviews with knowledgeable aerospace personnel identified 15 areas of concerns which warranted further investigation. A Site Investigation (SI) was recommended to collect and analyze the site's environmental media (soil, groundwater, surface water, and sediment) to evaluate the presence or absence of contamination.
- 1993-1996: The SI report concluded that the presence of constituents in soil, groundwater, surface water, and sediment might pose a risk to human health and the environment. The SI recommended that an RFI be conducted to assess the nature and extent of the contamination present at the

site, and perform risk assessments to determine if the contamination is potentially detrimental to human or ecological health.

- 1995-1996: An Interim Measure was performed to remove site contamination found in and around the launch pad's concrete, deluge flume-way and basin. The clean-up action resulted in the removal of approximately 74 cubic yards (104 tons) of material.
- 1995-1997: An RFI was performed, detailing the sampling and analysis of site soil, groundwater, surface water, and sediment. These results were used to determine human health and ecological risks. The Human Health Risk Assessment (HHRA) indicated that potential risk exists from site groundwater, soils, and surface water (due to ingestion of fish). The Ecological Risk Assessment (ERA) indicated that no unacceptable ecological risk is present at the site.
- 1997: A Long Term Monitoring (LTM) Workplan was submitted and LTM was initiated. The 45th SW IRP team felt it was incumbent to implement LTM immediately following the RFI in order to ensure that groundwater contaminants were appropriately monitored and tracked.

SUMMARY OF SITE RISK

As part of the RFI activities, an HHRA and an ERA were conducted to estimate the health and environmental risks associated with the site-specific contamination. The risk assessments were performed in accordance with risk management decision processes established by the USEPA, FDEP, and the USAF at the time the RFI was initiated.

Chemicals of Concern (COCs) identified for human health during the RFI were:

- Groundwater: 1,1-dichloroethene, arsenic, iron, thallium, and vinyl chloride

- Soil: arsenic, aroclor 1254, and thallium
- Surface Water (due to fish ingestion): iron

The HHRA demonstrated that soil, groundwater, and surface water (due to fish ingestion) pose potential unacceptable human health risk. Groundwater exceeded the one in one million (1/1,000,000) cancer threshold, as well as the noncarcinogenic hazard index target value of 1.0 for the hypothetical future child resident and the hypothetical future adult resident. The one in one million cancer risk threshold was also exceeded for the hypothetical future construction worker scenario. Arsenic and vinyl chloride were the primary contributors to cancer risk in groundwater, while arsenic, iron, and thallium were the significant contributors to noncarcinogenic hazard. During the risk management decision process, it was determined that arsenic, iron, and thallium concentrations in groundwater did not exceed Maximum Contaminant Levels (MCLs) established by USEPA.

Soils exceeded the one in one million cancer risk threshold for the hypothetical future adult and child residents. Only the hypothetical future child resident scenario exceeded the noncarcinogenic hazard index of 1.0. Arsenic and aroclor 1254 were the major contributors to cancer risk, while thallium was the primary contaminant responsible for noncarcinogenic risk. During the risk management decision process, it was determined that arsenic concentrations in soil did not exceed background concentrations.

Neither surface water nor sediment were directly identified as posing an unacceptable cancer risk or noncarcinogenic hazard. However, when surface water was evaluated in the context of fish ingestion, it was determined that iron concentrations in surface water would exceed the noncarcinogenic target hazard index of 1.0 for fish consumption by the hypothetical future child resident. During the risk management decision process, it was considered that iron is naturally occurring and was not detected at levels significantly higher

than background concentrations found naturally on CCAFS. Based on these considerations, iron was determined not to be of concern in surface water.

The ERA was conducted to evaluate the possibility that land and aquatic organisms (eco-receptors) may be at risk from site-related contaminants. The ERA was based on laboratory analyses of groundwater, soil, surface water, and sediment samples.

The ERA concluded that potential risk from the exposure to and/or ingestion of groundwater, soil, surface water, or sediment by eco-receptors is marginal. Several factors mitigate the potential concern. These could include routine facility operation and maintenance activities, less than optimal habitat found within facility boundaries, the extent of the eco-receptor's normal foraging area, and the seasonal variability associated with the amount of surface water present at any given time.

WHAT ARE THE CLEANUP OBJECTIVES AND LEVELS?

The remedial action objectives (RAOs) are to:

- 1) Protect humans from exposure to shallow groundwater and prevent consumption of groundwater from the shallow aquifer (where contaminant concentrations are higher than regulatory standards), and
- 2) Prevent unacceptable human contact with site soils.

Table 1 lists the COCs present at SLC-11. The first column lists the chemical name, the second column lists the maximum concentration in each impacted medium at SLC-11 during the RFI, and the last column presents the clean-up level to be achieved at the site. Please note that through the risk management decision process, several contaminants originally designated as COCs were determined not to pose an unacceptable risk (see "Summary of Site Risk", above), and are therefore not addressed by the remedial action.

TABLE 1—CLEANUP GOALS

Site-Related Chemicals of Concern (COCs)	Maximum Detected Concentration	Site-Specific Clean-up Level ¹
GROUNDWATER		
Vinyl chloride	36 ug/L	1 ug/L
1,1-dichloroethene ²	0.33 ug/L	7 ug/L
SOIL		
Aroclor 1254	1 mg/kg	0.5 mg/kg
Thallium	9.9 mg/kg	1 mg/kg

¹ Clean-up level represents the most stringent value among USEPA and FDEP criteria at the time of the final investigation.

² Concentrations of this compound detected during the RFI were below the USEPA MCL used as the site-specific cleanup level, however the compound will be monitored as part of the final remedy due to its mobility and the fact that vinyl chloride may be formed as break-down product

CLEANUP ALTERNATIVES FOR SLC-11

Clean-up alternatives are different combinations of plans to restrict site use and to contain, remove, and/or treat contamination in order to protect public health and the environment. Only two alternatives were considered because of low levels of contamination present at the SLC-11. The clean-up alternatives considered for the SLC-11 are summarized below.

No Action: Evaluation of the No-Action alternative is used as a basis for comparison with other alternatives. Under this alternative, no remedial action would be taken to reduce human health risks or restrict site use. No monitoring of COC concentrations in the groundwater would be performed. It was determined this alternative would not attain the RAO.

Land Use Controls and Natural Attenuation with Long Term Monitoring: Under this alternative, material processes such as biological degradation, dispersion, advection, and adsorption would reduce COC concentrations to cleanup levels over time.

Groundwater would be regularly sampled and analyzed to monitor and document the decrease in contaminant concentrations. Data collected during the RFI and other Basewide assessments indicate that biodegradation will likely reduce contaminant concentrations below cleanup levels within eight years. Additionally, the 45th SW would implement site-specific land use controls to prevent the exposure of hypothetical future residents to contaminated soils, prevent consumption of shallow groundwater, and limit exposure to shallow groundwater. In the long term, this remedy alternative will meet RAOs and will also allow re-evaluation to determine if the remedy is working and provide an opportunity for change if necessary. The 45th SW, USEPA, and FDEP have entered into a Memorandum of Agreement (MOA), which outlines how land use controls will be managed at the 45th SW. The MOA requires periodic inspections, condition certification, construction project coordination, and agency notification. Site specific details can be found in the SLC-11 Land Use Control Implementation Plan (LUCIP).

EVALUATION OF REMEDY ALTERNATIVES

Each cleanup alternative was evaluated to determine how each potential remedy would comply with the four general standards for corrective measures. The four general standards for corrective measures are:

- Overall protection of human health and the environment;
- Attain media cleanup standards;
- Control the sources of releases; and
- Comply with standards for management of wastes

The second alternative (Land Use Controls and Natural Attenuation with Long-Term Monitoring) meets each of the above criteria, while the no action alternative remedy would not meet them.

LAND USE CONTROLS AGREEMENT

By separate MOA dated 23 December 1999, with USEPA and FDEP, CCAFS, on behalf of the Department of the Air Force, agreed to implement base-wide, certain periodic site inspection, condition certification, and agency notification procedures designed to ensure the maintenance by installation personnel of any site-specific land use controls deemed necessary for future protection of human health and the environment. A fundamental premise underlying execution of that agreement was that through the USAF's substantial good-faith compliance with the procedures called for therein, reasonable assurances would be provided to the USEPA and FDEP as to the permanency of those remedies which included the use specific land use controls.

Although the terms and conditions of the MOA are not specifically incorporated or made enforceable herein by reference, it is understood and agreed by the USAF, USEPA, and FDEP that the contemplated permanence of the remedy reflected herein shall be dependent on CCAFS's substantial good-faith compliance with the specific land use control maintenance commitments reflected therein. Should such compliance not occur or should the MOA be terminated, it is understood that the protectiveness of the remedy concurred in may be reconsidered and that additional measures may need to be taken to adequately ensure necessary future protection of human health and the environment.

WHAT IMPACTS WOULD THE CLEANUP HAVE ON THE LOCAL COMMUNITY?

There would be no impacts to the surrounding communities because groundwater underlying the site is not used for potable water. The natural attenuation and LTM alternative includes administrative actions to limit the use of groundwater until cleanup levels have been reached. Additionally, residential use of the SLC-11 is not occurring nor is it expected in

the near future. As long as CCAFS remains an active gateway for the aerospace industry, SLC-11 is expected to continue operating in an industrial capacity.

Land use controls will be put in place to ensure that workers are adequately protected when engaging in activities that require contact with groundwater and that construction activities do not cause contaminant re-distribution.

WHY DOES THE 45th SW IRP TEAM RECOMMEND THIS REMEDY?

The team recommends the proposed remedy because the naturally occurring biodegradation processes observed at the site (and predicted with Base groundwater models) are sufficient for the removal of low concentrations of VOCs. The LTM program will be used to assess and document reduction in contaminant concentrations to the cleanup goals. The land use controls will also prevent exposure to contaminants prior to the cleanup levels being achieved. The proposed remedy meets the four general standards for corrective measures.

NEXT STEPS

The 45th SW IRP team will review all comments on this SB to determine if the proposed remedy needs modification prior to implementation and prior to incorporating the proposed remedy into the CCAFS HSWA permit. If the proposed remedy is determined to be appropriate for implementation, then the LTM program will be continued, the land use controls will be initiated, and a LUCIP will be developed and incorporated into the MOA.



LAND USE CONTROL IMPLEMENTATION PLAN

SPACE LAUNCH COMPLEX 11 SOLID WASTE MANAGEMENT UNIT 36 (SWMU NO. 36) 45TH SPACE WING CAPE CANAVERAL AIR FORCE STATION CAPE CANAVERAL, FLORIDA

Facility Description

Space Launch Complex 11 (SLC-11), Solid Waste Management Unit 36 (SWMU No. 36), was built in 1957 to support the United States Air Force (USAF) Atlas Missile Program at Cape Canaveral Air Force Station (CCAFS), Florida. Vehicle assembly check-out and launching activities occurred at the site between 1957 and 1966. The site also served as a training ground (1960-1963) for NATO troops in the deployment of the Atlas as an Intercontinental Ballistic Missile. Regular painting and maintenance operations also occurred at the site. SLC-11 was deactivated in 1966 and salvaged in 1967. Most of the complex is now abandoned, except for launch support and ready buildings which actively support Space Launch Complex 36 activities.

Location

(Reference Site Map on last page of this document)

Site Plan Coordinate	Northing	Easting
North	1506595.85	804227.56
West	1505691.18	802940.69
South	1505138.18	803993.03
East	1505764.14	804775.65

Objective

Implementation of site-specific land use controls to protect against exposure to contaminated soil and shallow groundwater, to prevent consumption of the shallow groundwater, and to prevent fishing on the site.

Land Use Controls (LUCs) to be Implemented:

Administrative:

- The property will be prohibited from residential or other non-industrial development without prior written notification to the Florida Department of Environmental Protection (FDEP) and the United States Environmental Protection Agency (USEPA) concerning the SWMU land use change. Dependent on site conditions and the nature and intensity of the proposed land use change, additional site investigations and assessments could be required for the USAF. Based on these analyses,

LUCIP
LAUNCH COMPLEX 11 (SWMU NO. 36)
CAPE CANAVERAL AIR FORCE STATION
OCT 2001

additional remedial measures may be required prior to land use change.

- Perform and document baseline LUC audit upon finalization of the Statement of Basis.
- Perform and document quarterly LUC compliance inspections in accordance with 45th SW LUC Operations Manual.
- Perform, document, and report an annual audit on LUC implementation, maintenance, and compliance in accordance with the 45th SW LUC Operations Manual and the current CCAFS Corrective Action Management Plan (CAMP).
- The property Land Use Control Implementation Plan (LUCIP) shall remain in effect until:
 - a) Changes to applicable Federal and State risk-based clean-up standards occur which indicate site contaminants no longer pose potential residential risk; or
 - b) Reduction in site contaminant concentrations to below Federal and State residential risk-based clean-up standards occurs.
- In the event of property realignment, transfer, or re-use for non-industrial or non-commercial purposes, assessment and remediation may be necessary to ensure that impacts to ecological receptors are not increased or to mitigate potential ecological impacts where residual contamination exists.

Soil:

- Soils will not be disturbed or moved during property development, maintenance or construction, without:
 - a) USAF review, coordination, and approval of the proposed construction/development plans via AF Form 103 (Base Civil Engineer Work Clearance Request), 332 (Base Civil Engineer Work Request), 813 (Request for Environmental Impact Analysis), or similar process;
 - b) Ensuring proper engineering controls are in-place so that unauthorized release or disposal of the affected media does not occur. This includes conducting appropriate testing and developing a disposal plan in accordance with the LUC Operations Manual prior to off-site disposal; and
 - c) Use of proper personal protection equipment by site workers, as determined by the project proponent's occupational health and safety advisor.
- The site will be posted with proper warning signs in accordance with the LUC Operations Manual and the CCAFS Hazardous and Solid Waste Amendments (HSWA) Permit.

Groundwater:

- The consumptive use of the site's shallow aquifer groundwater will be prohibited.
- Incidental consumption and dermal exposure to groundwater from the surficial aquifer will be prevented. This will be addressed by the project proponent's health and safety advisor.

LUCIP
SPACE LAUNCH COMPLEX 11 (SWMU NO. 36)
CAPE CANAVERAL AIR FORCE STATION
OCT 2001

- Groundwater will not be contacted, pumped, or discharged during property development, maintenance, or construction, without:
 - a) USAF review, coordination, and approval of the proposed construction/development plans via AF Form 103 (Base Civil Engineer Work Clearance Request), 332 (Base Civil Engineer Work Request), 813 (Request for Environmental Impact Analysis), or similar process;
 - b) Ensuring proper engineering controls are in-place so that unauthorized release or disposal of the affected media (groundwater) does not occur. This includes conducting appropriate testing and developing a disposal plan in accordance with the LUC Operations Manual prior to any pumping or discharge of groundwater; and
 - c) Use of proper personal protection equipment by site workers, as determined by the project proponent's occupational health and safety advisor.
- USAF will institute a long term monitoring (LTM) program of groundwater in the surficial aquifer in accordance with an approved LTM work plan and the CAMP as part of the CCAFS HSWA Permit. Reports will be submitted annually, along with revised work plan recommendations, until such a time as the relevant regulatory agencies agree that contaminant concentrations in groundwater no longer warrant LTM.
- The site will be posted with proper warning signs in accordance with the LUC Operations Manual and the CCAFS HSWA permit.

Statement of Basis:

The Statement of Basis (SB) is currently being reviewed. It is anticipated that the SB will be accepted/incorporated into the HSWA Permit, scheduled for issuance early in 2002.

Additional Information:

Long Term Monitoring Plan: Natural Attenuation (NA) is evaluated through LTM. Currently, as per the LTM Work Plan and Annual Report, monitoring are sampled semi-annually. Surface water is also sampled to ensure that unacceptable levels of contamination do not migrate from the groundwater into the nearby canal. The scope and magnitude of the LTM program are reviewed and adjusted annually, based on recent data trends.

Pertinent Document Reference:

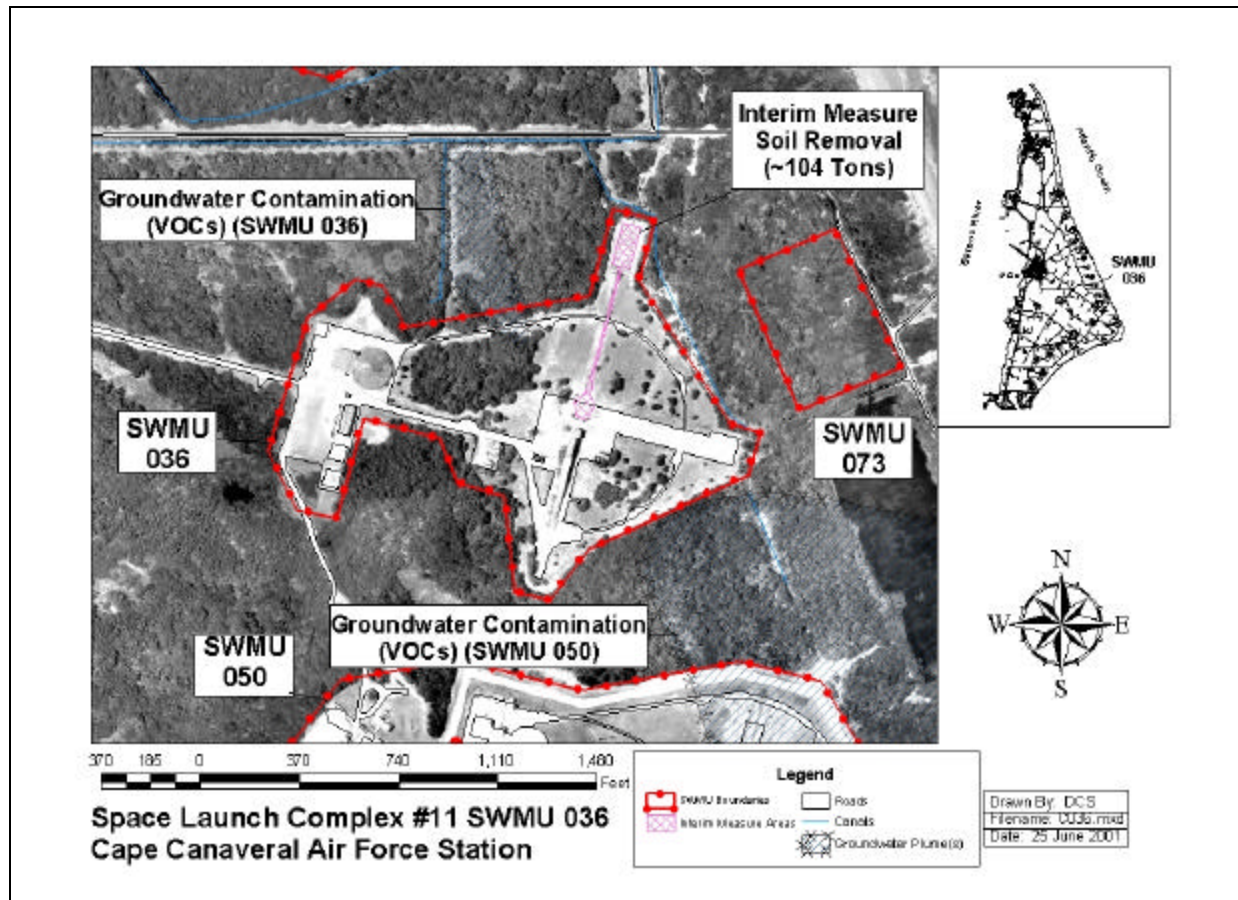
RCRA Facility Investigation Report, Space Launch Complex 11, SWMU No. 36, O'Brien & Gere Engineers, Inc., September 1997.

Interim Measures/Long Term Monitoring (IM/LTM) Work Plan, Space Launch Complex 11, SWMU No. 36, O'Brien & Gere Engineers, Inc., September 1997.

LUCIP
SPACE LAUNCH COMPLEX 11 (SWMU NO. 36)
CAPE CANAVERAL AIR FORCE STATION
OCT 2001

Semi-Annual Monitoring Report No. 2 and Annual Report (2000), Space Launch Complex 11, SWMU No. 36, BEM Systems, Inc., March 2001.

Space Launch Complex 11 – Site Map



Please contact the 45 SW Installation Restoration Program Office to obtain additional information, including: the 45 SW Land Use Controls Operation Plan; the CCAFS HSWA Permit; a complete record of corrective actions at SLC-11; or other related documents, guidance, and regulations. The IRP office can be reached by phone at (321) 853-0965. Information can also be obtained via the IRP website at http://www.mission-support.org/45SW_IRP_EA